

# FOREST CONTROL

# by CONTINUOUS INVENTORY

"Today I have grown taller from walking  
with the trees."

...Karle Wilson

Milwaukee, Wis. September, 1960 No. 78

## THE FOUNDATION BENEATH THE FOUNDATION

THE SCIENTIFIC METHOD gives foresters a fine, firm foundation for the measurement of the many and varied trees and tree associations in the forest universe. Statistical science makes the CFI system possible. No matter how erratic man or nature may be, the strict precepts of science will provide a continuous measure of them in dimension and in indicative concept. There are only two precautions.

There must be a hearty appreciation of the importance of precision in measurement, and there must be close adherence to standards in application.

Without this foundation beneath the foundation of science the edifice that foresters are building is apt to teeter, totter and shake. Sound forest management and silviculture require a fundamentally sound background of facts. I have found fearful infirmities in the field of data collection in many forms of forest inventory in the past decade. These infirmities must be eliminated wherever possible.

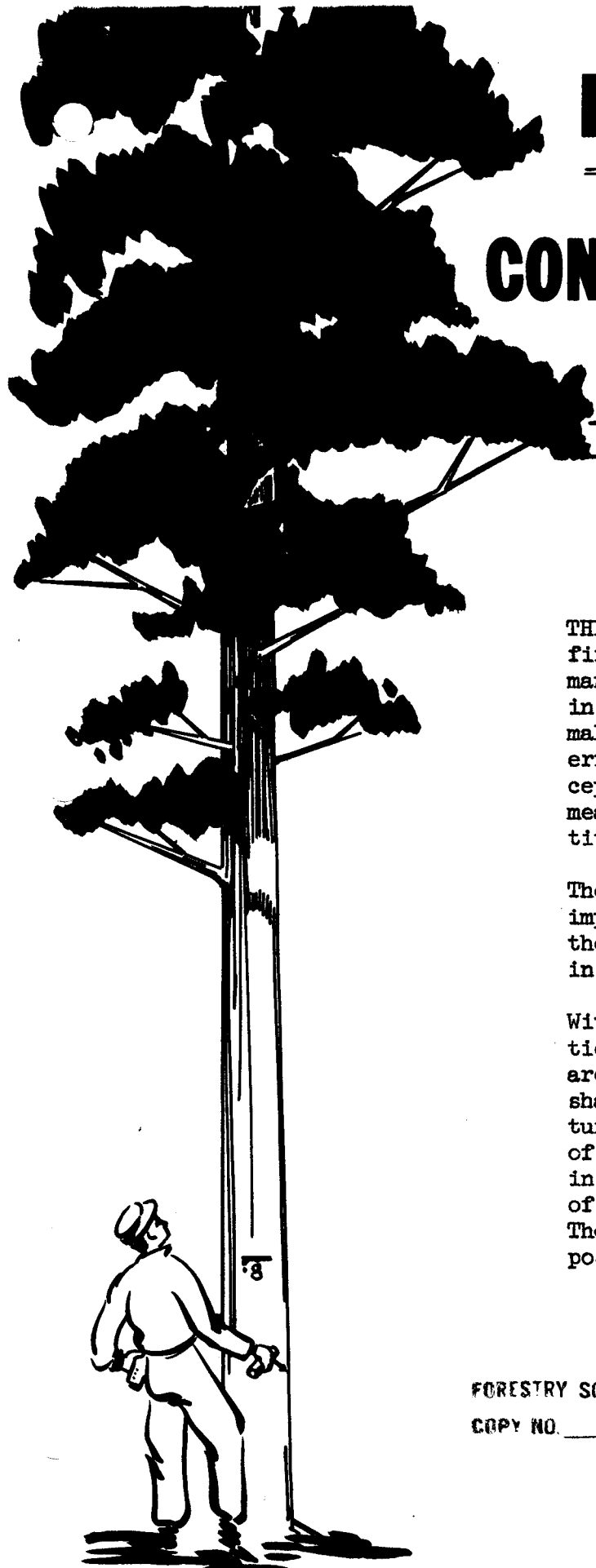
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*The Forester*



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## PART I

### TREE RECORDS ARE ONLY AS GOOD AS THE TECHNIQUES USED IN MAKING THEM

Wrapped up in an increasing over-burden of important side issues there is one extraordinary kernel of purpose in the Region 9 Continuous Forest Inventory system. This kernel is continuity of control over the forest. Important in its own right, for long range management planning, this essential ingredient has many other purposes and values as well, all of which may be lost by careless workmanship. The most important requirement for the successful application of the CFI system is precise record keeping, and the most serious threat to its continuous use is slipshod woods work.

#### CFI Principles Encourage Careful Work Methods

Carefulness is a quality built into the CFI system. The permanency of the sampling design, in contrast to any temporary plot system, implies that an extra measure of care is used with the plots, and this is indeed the case.

The cruiser not only enjoys the exactness of his duties, and the absence of constant pressures to increase production, but he has other significant deterrents to rough and careless work. For one thing, he knows that mistakes can be found by checking the numbered trees at any time, and that most errors will surely be found at the time of the first remeasurement. The system discourages the concurrent interspersing of temporary and permanent samples. When this interspersing occurs there always goes with it the temptation to reduce the standards of accuracy of the permanent plots to the lower accuracy standards of the temporary plots. Say what you will, the one-shot cruise is never made with the precision of the permanent plot cruise.

There is one other built-in protection against carelessness. The various steps in the system contain educational features which reduce the monotony of the work and increase the accuracy. In spite of this, careless work does sometimes occur, and mistakes of different kinds are found.

#### Nature, the Scientific Method and the Cruiser's Mistakes

Use of the scientific method, which so intrigues foresters of the present generation, requires a much stronger appreciation of the importance of precision in measurement and adherence to standards in application. Regardless of the inexact and variable form of Nature's universe, it can be measured. Statistical science supplies a sampling technique by means of which we measure a portion in order to judge the whole. The expansion of the measured sample to the level of the entire forest ownership makes minor mistakes in the sample expand to enormous errors in the whole.

There is no doubt about it, we can collect and manipulate statistics to scientifically measure the many and varied forms of the forest, but we must measure with the highest criteria of excellence. We cannot have scientific validity with bungling technology in inventory work.

Accuracy in forest inventory is however a relative matter, for absolute accuracy is impossible to attain. The theory of sampling precludes this for one thing, and for another, all inventory records are involved in the inescapable errors of technique and judgment. These two types of mistake are in turn caused by measurement difficulties within the object being measured or by human failure.

#### Errors Caused by Difficulties Within the Object Being Measured

Trees in forest stands can be precisely measured but they cannot be measured with absolute accuracy. Trees shrink and swell each day throughout the dormant or measuring season, and they slough off bark in an unpredictable manner. The point of measurement is never exactly the same in successive measurements. The diameter tape does not give absolute answers, even when the tree is a perfect cylinder, and this error increases with bole irregularity. Tree barks are either rough or smooth, hard or soft, and respond differently to the pull on the tape. Bark destroying fungi change bark thicknesses. Tree trunks have varying degrees of abnormality. There are bumps, wounds, disease deformities and extreme tapers. Trees lean, bend, curve and crook. All of these and many more factors influence the accuracy of tree measurements and the best we can hope for is that they will randomize over the years. None of these difficulties reduce the need for scientific precision in the task of measuring, but there is little we can do to alleviate the trouble.

#### Errors Caused By Human Failure

Personal errors are especially serious in permanent plot work. Both the forces of administration, and the cruiser in person, are involved in this problem which embraces many separate segments of the standard inventory control job.

Field instructions for plot work are sometimes poorly written, incomplete or incorrect. This not only confuses and befuddles the cruiser but it also encourages sloppy work habits. This confusion, combined with unnecessary haste, disinterest and skepticism or the inability to grasp the significance of the work, can play havoc with the CFI job. The best of planning for remeasurement is weakened materially when the original plot records are full of flaws and flagrant inconsistencies.

Faulty job administration is responsible for many of these troubles. Far too many front office foresters have never learned the value of the four great essentials of sound inventory work. These are:

1. PROFESSIONAL DEMONSTRATION OF PERMANENT PLOT WORK TECHNIQUES.
2. EXPERT AND REPETITIVE CRUISER TRAINING.
3. UNDERSTANDING AND INSPIRING SUPERVISION.
4. ADEQUATE MEASURED CHECKS ON COMPLETED PLOT SAMPLES.

CFI aids foresters in their search for the true and basic principles of forest ~~management~~. The permanent plots, repeatedly checked by observation and record, are the means to this end. This application of the scientific method needs special direction for it will not function well with weak techniques and poor judgments. The timber cruiser is error prone in at least six important particulars of this work. These include errors in plot area classification, diameter tape use, cull deduction, usable length decisions, and tree quality and vigor grading.

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